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(54) CONVEYOR FOR A LOAD-MOVING SYSTEM

FÖRDERER MIT LASTANTRIEBSSYSTEM

CONVOYEUR POUR SYSTEME DE DEPLACEMENT DE CHARGE

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Description

TECHNICAL FIELD

[0001] The present invention relates to a conveyor for a load moving system, comprising a carriage movable along the guides of a ground-based support structure, which rests on a floor, or of a support structure suspended from an overhead framework, and having connection means for connecting the carriage to a drive member located on the support structure so as to move the carriage along the guides.

BACKGROUND ART

[0002] Equipment for moving materials is known in the art which is made up from modular frames carrying a coplanar array of parallel, motor-driven rollers on which a pallet loaded with material to be transported, resting on the rollers, is conveyed along a predetermined course formed by a plurality of modules located adjacent each other, in end-to-end alignment.

[0003] Such equipment has considerable limitations in use as the roller frames are effective only for forming straight, horizontal courses; auxiliary equipment such as lifts, chutes and turntables are thus required for forming courses with changes in height or direction.

[0004] Other known conveyors are so-called "rolling-shutter" conveyors in which one or more endless roller chains which pass over two end pulleys are guided along a metal support structure having the shape, in plan, of the course to be travelled; flat support elements are connected to the chains and located adjacent each other so as to form a substantially continuous, articulated support bed like that defined by a rolling shutter for a window; the objects to be conveyed may be placed on this bed either directly or on pallets. These conveyors are very bulky, are very expensive to install and maintain, are not very reliable because of the long length of the drive chains, which is twice that of the course actually covered by the conveyor, which causes problems in maintaining the tension in the chains, of seizure of the rollers forming the chains and noise.

[0005] Similar problems are presented by ground-based conveyors in which the load is carried on platforms mounted on carriages driven along guides of a metal support structure by one or more motor-driven chains of the type previously described through rigid mechanical transmission devices, which may be deactivatable temporarily, for example to form accumulations.

[0006] Finally, overhead conveyor systems are known which are constituted by a suspended guide along which motor-driven carriages are movable, for example on wheels, and from which conveyor hooks are suspended; the carriages pick up control signals and power for their motors directly from conductive tracks (bus bars) carried by the guide through sliding shoes. Such systems are very efficient and silent but are suitable only for very clean working environments as, otherwise, the conductive tracks quickly become soiled by dust, grease, etc, causing loss of contact between the tracks and the shoes of the carriages with the possible loss of control and/or power at least along certain sections. Moreover, it is not possible to use such conveyors in inflammable environments since the rubbing of the shoes on the bus bars may cause sparks. Finally, these conveyors, if also used on long inclined courses (either rising or descending) are suitable only for limited loads since, beyond certain loads, the wheels may slide on the guides.

[0007] The aforedescribed drawbacks may be partly overcome by the conveyor system according to US-A-5,062,368. However, this reference relates to a conveyor system primarily adapted to be used solely on the ground and that, in any case, needs, to be operated effectively, to be built with a very high precision, specially as far as the guides and the engagement system of the pallet are concerned. This leads to very high production and maintenance costs. Moreover, this system is suitable for pallets of small dimension only and can displace the pallet along orthogonal directions only. Finally, at least as far as the embodiments shown are concerned, it does not meet, nowadays, the governmental safety regulations.

DISCLOSURE OF INVENTION

[0008] The object of the invention is to provide a conveyor system which is free from the disadvantages described above and is still suitable for manufacture in the form of modules. Moreover it is also the object of the invention that the modules be usable equally well on the ground and for suspended structures.

[0009] The invention thus provides a conveyor for a load-moving system, comprising a support structure as defined in Claim 1.

[0010] More particularly, each transmission member is constituted by an endless belt which passes over two pulleys located at opposite ends of the respective module and one of which is motor-driven, while the connection means of each carriage are constituted by a pair of shoes engageable with one face of the belt arranged for this purpose and against which they are pressed by thrust means; the shoes being located at a mutual spacing, measured in the direction of advance of the belt, greater than the maximum distance between the belts of two immediately adjacent modules of the conveyor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] These and other characteristics of the invention will become more apparent from the following description of one preferred embodiment thereof, given by way of non-limitative example, with reference to the appended drawings, in which:

Figure 1 is a partly-sectioned front-elevational view of the conveyor of the present invention;
Figure 2 is a partly-sectioned side-elevational view of the conveyor of Figure 1;
Figure 3 is a side-elevational view of a support module for the conveyor of the invention;
Figure 4 shows the junction between two modules and an elongate carriage used on the conveyor of the invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0012] With reference to Figure 1, a conveyor is shown generally indicated 1 for effecting the transfer of any type of load along a course of any type and form. The conveyor 1 includes a carriage 2 movable along parallel guides 3 mounted on a self-supporting support structure 4 extending longitudinally in the direction of the guides 3; the support structure 4 illustrated may be located flush with the floor 5, for example set into a channel as shown in Figure 1, or may simply rest on the floor or, if rotated through 180°, may be suspended from an overhead framework, not shown. For this purpose, the guides 3 are formed as two C-sections which are open towards each other so as to provide bilateral guiding (upwardly and downwardly) for the carriage 2.

[0013] The support structure 4 is constituted by a plurality of pairs of symmetrical parts 6 and 7 joined transversely so as to be mirror imaged by means of welded transverse spacer members 9 (Figure 1), which also act as stiffening members, so as to form a plurality of modules 8 of predetermined length for guiding and supporting the carriage 2, one of which is illustrated completely in Figure 3; the modules 8 can be connected in series with each other in adjacent, end-to-end positions to form the said predetermined course along which a series of carriages 2 may run to convey the said loads.

[0014] A particular application of the invention is to convey parts being worked along the production line of an industrial plant; for this purpose, the modules 8 may be linked in sequence in a straight horizontal line, possibly with rising and descending portions with a maximum slope of about 20° to the horizontal, or may be connected in a non-rectilinear arrangement with a minimum angle between two immediately adjacent modules 8 of about 15° or more.

[0015] More particularly, the parts 6 and 7 of each module 8 are metal structures made from steel sections (or of other material such as aluminium) welded and/or riveted together and the guides 3 are constituted by respective C-sections 10, 11 carried by the parts 6 and 7 respectively and each defining a pair of planar, parallel tracks 12 and 14 which face each other in a vertical direction.

[0016] The carriage 2 may run on the guides 10, 11 supported by one or two pairs of support wheels or rollers 15 manufactured from a special synthetic material with a high compressive strength and low noise when rolling; the support wheels 15 may run either on the lower tracks 14 or on the upper tracks 12. The carriage 2 also has one or two further guide wheels 16 which rotate on journals 17 with axes which are vertical or, at least, perpendicular to the axes of the support wheels 15; the guide wheels 16 are arranged in the longitudinal plane of symmetry of the carriage 2 and engage a central channel or track 18 defined by the outer, facing surfaces 19 of two profiled longitudinal sections 20 and 21 of the parts 6 and 7 respectively so as to guide the carriage 2 laterally; depending upon particular constructional requirements, the guide wheels 16 may be mounted on the upper face of the carriage 2 (Figures 1 and 2) or on the lower face, beneath the plane of the chassis 23 of the carriage 2 (Figures 3 and 4).

[0017] The module 8 houses a transmission member for transmitting drive to the carriage 2, this being constituted by an endless belt 24 (Figure 3) which extends longitudinally between the two parts 6 and 7 of each module 8, passing over two pulleys 25 and 26 located at the ends of the module 8 and rotatable on shafts fixed to the two parts 6 and 7. The pulley 25 is idle while the pulley 26 is driven, being connected to a geared motor 27 of known type, not described in detail by means, for example, of a belt 28, the pulley 26 in turn driving the belt 24 to effect a predetermined rectilinear movement; in the embodiment shown purely by way of example, the belt 24 is kept tensioned between the pulleys 25, 26 by a take-up pulley 29 which ensures that the belt 24 is kept in firm contact with the drive pulley 26 over not less than about 250° to avoid slip. The belt 24 may also be tensioned by known tensioning systems on the wheel 25.

[0018] To provide the maximum flexibility in the formation of the course for the carriage 2, the geared motor 27 of each module 8 is controlled independently of the others by a central control unit, known per se and not visible in the drawings. The upper pass 30 of the belt 24 of each module 8 runs on a longitudinal support element 31 which is fixed to one (or both) of the parts 6, 7; the element 31 is constituted by a hollow profiled section with flat walls of which the upper, outer, slide face 32 (Figure 1) is covered with a layer of low-friction material 33 to reduce friction between the belt and the support.

[0019] The carriage 2 is provided with mechanical connection means for connecting the carriage to the belt 24; in the embodiment shown in Figure 3, the carriage 2 is constituted by the rigid interconnection of two identical carriages 2a (of which, for simplicity, only one is illustrated) spaced at a predetermined distance from each other by means of a longitudinal member 2b illustrated in broken outline. In this case, each carriage 2a has four wheels 15 and two guide wheels 16 and the connection means of each carriage 2a are constituted by a sliding shoe 34 located substantially equidistant from all four wheels 15.

[0020] The shoe 34 comprises a rigid body 35 pivoted on a pin 36 housed within a slot 37 of a fork 38 fixed to the carriage 2a and projecting from its lower part; the

rigid body 35 has a sole plate 39 of synthetic material with a high coefficient of friction fixed thereto which, when urged into contact with the belt 24, can generate a transmission force sufficient to drive the carriage in the most onerous load conditions envisaged without danger of relative slip; the shoe 34 is connected to the carriage 2a by an articulated connection to allow the shoe itself to pivot and move vertically relative to the carriage 2 to a small extent to comply with any variation in the relative position of the carriage 2 and the belt 24 during the movement of the carriage.

[0021] To ensure that the carriage 2a is driven in any condition, the shoe 34 is pressed against the belt 24 by means of two helical springs 40 (or equivalent resilient systems) with a force sufficient to ensure that the shoe 34 is kept in close contact with the belt 24, without relative slip; the transmission of drive from the belt 24 to the carriage is always ensured, even when the carriage is empty and the biasing force of the springs 40 exceeds the weight of the carriage 2, or when the module 8 is inverted through 180°, that is when the carriage is turned upside-down, since this latter will then run along the upper track 12 of the guides 10, 11.

[0022] The articulated connection of the shoe 34 on the pin 36 allows it to rock in a vertical plane through an angle of about ± 20° to the vertical to maintain contact with the belt 24, particularly when the carriage 2 enters a module 8 which is inclined upwardly or downwardly, or to facilitate the passage of the shoe across the junction between two consecutive modules; the slot 37 in turn allows the shoe 34 to slide vertically relative to the carriage by about 5 mm to allow the shoe to be separated from the belt 24 by means of a lifting device of known type, not shown in the drawings, either located on the ground at a station at which the carriage is to stop or on the carriage 2 itself.

[0023] To ensure that the shoe 34 maintains perfect contact with the belt 24 even in unfavourable circumstances, the belt is preferably constituted by a belt 42 (Figure 2) with external teeth 43 while the sole plate 39 of the shoe 34 has complementary teeth adapted to mesh with the belt 42. As a further variation, the belt 42 may have teeth on both faces; in this case the pulleys 25 and 26 will also be toothed to eliminate any risk of the belt slipping.

[0024] Finally each carriage 2a has an engagement member 44 for connection to a load to be transported, for example a pallet carrying parts for working; this engagement member is constituted by a tow member (shown schematically in the drawings) pivoted on the upper part of the carriage 2a so as to project from the structure 4 and be capable of limited angular displacements to compensate for the inclination of the carriage on rising or descending portions of its course.

[0025] In the embodiment of Figure 4 the carriage 2, on the contrary, is constituted by a single, rigid, elongate frame 47 provided at opposite longitudinal ends with two shoes 45 and 46 both of which are pivoted and identical to the shoe 34 just described and, on its opposite face, with a pair of non-pivoted spindles 48 which take the place of the pivoted members 44 and are welded so as to project vertically from the upper part of the frame 47 to receive the structure for carrying the load and fix it to the carriage itself.

[0026] According to the invention, in order to ensure the continuity of the drive to the carriage 2 as it moves from each module 8 to the identical module 8 immediately adjacent thereto, indicated 8' in Figure 4, in both of the embodiments of Figures 3 and 4, it is necessary for the two shoes 45, 46 of any one carriage 2, or the two shoes 34 of each pair of carriages 2a connected rigidly together by the longitudinal member 2b to form a carriage 2 of predetermined length that can be adjusted at will according to the length of the longitudinal member 2b (which may also be telescopic), to be mutually spaced by a distance D (pitch) measured in the direction of advance of the belt 24 which is greater than the maximum distance (space) between the belts 24 of each pair of immediately adjacent modules 8, 8' and, preferably, greater than the interaxial spacing X between the centre of rotation of each pulley 25 of a module 8 and the opposite pulley 26 of the next module 8.

[0027] Thus, when the carriage 2 advances and is in transfer from one module 8 to the next (Figure 4) the shoe closest to the module 8' (shoe 46) first leaves the belt 24 of the module 8 of origin and is suspended over the space between the two modules 8, 8'; the shoe 45, however, is still engaged with the belt 24 of the module of origin, and, as a result of the advancing movement of the respective belt 24, urges the carriage 2 to move in the direction of the arrow towards the module 8'; subsequently, the shoe 46 engages the belt 24 of the module 8' and the carriage 2 is located in the configuration illustrated in Figure 4 in which its two shoes 45, 46 engage both the belts 24 of the two adjacent modules 8, 8' simultaneously; finally the shoe 45 leaves the module 8 of origin and the carriage 2, despite the shoe 45 being suspended over the space between the two modules 8, 8', continues its travel since, as a result of the advance of the belt 24 of the module 8' in the direction of the arrow, the shoe 46 already engaged with this belt 24, pulls the carriage towards the latter so as to complete the transfer to the module 8'.

Claims

1. A conveyor for a load-moving system, comprising a support structure (4), at least one carriage (2) movable along respective guides (3) carried by the support structure (4), the carriage (2) being adapted to support and convey a load, a transmission member (24; 42) carried by the support structure (4) and extending parallel to the guides (3), connection means (34; 45, 46) carried by the carriage and adapted to engage the transmission member (24;

42) to connect the carriage (2) firmly to the transmission member, and motor means (27) for activating the transmission member to move the carriage along the guides; and wherein the support structure is constituted by a plurality of mutually-independent, rectilinear modules (8) juxtaposed end-to-end to form a predetermined course, each module having its own motor means (27) independent of those of the other modules (8); the connection means (34; 45, 46) being such that, when the carriage (2) passes from a first module (8) to a second module (8') immediately adjacent thereto, the connection means are always engaged with the transmission member of at least one of the two adjacent modules (8, 8');

characterized in that, in combination:

(i)- the connection means of each carriage (2) are constituted by at least a pair of shoes (34; 45, 46) engageable with the transmission member (24;42);
(ii)- each of said shoes (34; 45,46) is mounted on the carriage (2) by an articulated connection (36; 37) to enable the angular position of the shoe to be varied and to allow the shoe to be displaced linearly in a direction perpendicular to the transmission member (24;42);
(iii)- each of said shoes (34; 45,46) is kept engaged with the transmission member by thrust means (40) which press the shoes against the transmission member (24;42); and
(iv)- the said at least two shoes (34; 45,46) of each carriage are spaced apart by a distance (D), measured in the direction of advance of the transmission member (24;42) greater than the maximum distance between two immediately adjacent modules (8, 8') of the conveyor.

2. A conveyor according to Claim 1, characterized in that each transmission member is constituted by an endless belt (24) which passes over two pulleys (25, 26) at opposite ends of the respective module (8), one of which pulleys (26) is motor driven, and in that said shoes (34; 45,46) are engageable with one face of the belt (24) arranged for this purpose and against which they are pressed by said thrust means (40); said distance (D) between the at least two shoes (34; 45, 46) of each carriage being greater than the maximum distance between the belts (24) of two immediately adjacent modules (8, 8') of the conveyor.

3. A conveyor according to Claim 2, characterized in that each of the shoes is constituted by a rigid body (35), connected to the carriage, and by a friction element (39) fixed to the rigid body and adapted to cooperate with the belt (24) so as to be fixed thereto.

4. A conveyor according to any one of Claims 2 or 3, characterized in that resilient means (40) are interposed between the shoe (34) and the carriage (2) to keep the shoe pressed against the belt (24).

5. A conveyor according to one of Claims 2 to 4, characterized in that said articulated connection (36;37) allows each shoe to be displaced linearly in a direction perpendicular to the belt (24).

6. A conveyor according to one of Claims 2 to 5, characterized in that the belt (24) is constituted by a belt (42) with teeth (43) on its face facing the shoe (34; 45, 46) and in that the shoe includes a toothed clutch member (39') adapted to mesh with the teeth of the belt (42).

7. A conveyor according to any one of Claims 2 to 6, characterized in that the belt (24) runs on a longitudinal support element (31) carried by each module (8) and extending between the pulleys (25, 26).

8. A conveyor according to Claim 7, characterized in that the support element (31) has a flat face (32) facing the belt (24) which is coated with a layer (33) of low-friction material, the face being in sliding contact with the belt.

9. A conveyor according to any one of the preceding claims, characterized in that the carriage (2) is movable along the guides (3) by means of at least two pairs (15) of support wheels rotatable about parallel axes and rolling on the guides, and in that at least one further wheel (16) is provided for guiding the carriage laterally along the guides.

10. A conveyor according to Claim 9, characterized in that the guides are constituted by a pair of C-sections (10; 11) facing each other and each defining a planar upper track (12) and a parallel lower track (14); the support wheels (15) being able to run either on the lower or on the upper track.

11. A conveyor according to Claim 9 or Claim 10, characterized in that the further wheel (16) rotates about an axis perpendicular to the axes of the support wheels (15).

12. A conveyor according to any one of the preceding claims, characterized in that the carriage (2) includes at least one engagement member (44; 48) adapted to tow the load along the guides (10; 11)

13. A conveyor according to Claim 12, characterized in that the engagement member (44; 48) is a draw member pivoted on the carriage (2).

Patentansprüche

1. Förderer für ein Lastantriebssystem, mit einer Tragstruktur (4), zumindest einem Schlitten (2), der entlang einer entsprechender Führungen (3) beweglich ist, die von der Tragstruktur (4) getragen werden, wobei der Schlitten dazu geeignet ist, eine Last zu tragen und zu fördern, mit einem Übertragungsglied (24;42), welches von der Tragstruktur (4) getragen wird und sich parallel zu den Führungen (3) erstreckt, mit Verbindungsmitteln (34;45,46), die von dem Schlitten (2) getragen werden und dazu geeignet sind, in das Übertragungsglied (24;42) einzugreifen, so daß der Schlitten fest mit dem Übertragungsglied verbunden ist, und mit einer Motorvorrichtung (27) zum Antrieb des Übertragungsgliedes und zur Verschiebung des Schlittens entlang der Führungen; wobei die Tragstruktur durch eine Vielzahl von gegenseitig unabhängigen, geradlinigen Modulen (8) gebildet wird, die jeweils mit ihren Enden nebeneinander angeordnet sind, so daß sie eine vorbestimmte Strecke bilden, und jedes Modul (8) seine eigene Motorvorrichtung (27) unabhängig von denjenigen der anderen Module aufweist; und wobei die Verbindungsmittel (34; 45,46) derart ausgebildet sind, daß sie, wenn der Schlitten (2) von einem ersten Modul (8) zu einem zweiten Modul (8'), welches diesem unmittelbar benachbart ist, wechselt, stets im Eingriff mit dem Übertragungsglied zumindest eines der beiden benachbarten Module (8,8') sind, **dadurch gekennzeichnet,** daß kombinationsweise

   (i) die Verbindungsmittel jedes Schlittens (2) durch zumindest ein Paar von Schuhen (34; 45,46) gebildet sind, die zum Eingriff in das Übertragungsglied (24;42) geeignet sind;
   (ii) jeder der Schuhe (34;45,46) mit einer gelenkigen Verbindung an dem Schlitten (2) montiert ist, so daß die Winkelstellung des Schuhs variiert und der Schuh linear verschoben werden kann in einer zu dem Übertragungsglied (24; 42) senkrechten Richtung;
   (iii) jeder der Schuhe (34;45,46) durch Andrückmittel (40) in Eingriff mit dem Übertragungsglied (24; 42) gehalten wird, welche die Schuhe gegen das Übertragungsglied drükken; und daß
   (iv) die zumindest zwei Schuhe (34;45,46) eines jeden Schlittens um einen Abstand (D), gemessen in Richtung des Vorschubs des Übertragungsgliedes (24;42), voneinander beabstandet sind, der größer ist als der maximale Abstand zwischen zwei unmittelbar benachbarten Modulen (8,8') des Förderers.

2. Förderer nach Anspruch 1, **dadurch gekennzeichnet,** daß jedes Übertragungsglied durch einen Endlosriemen (24) gebildet wird, welcher über zwei Riemenscheiben (25,26) an entgegengesetzten Enden des jeweiligen Moduls (8) geführt ist, wobei eine der Scheiben (26) motorgetrieben ist, und daß die Schuhe (34; 40,46) zum Eingriff in eine Seite des Riemens (24) geeignet ist, die für diesen Zweck ausgelegt ist und gegen die sie durch die Andrückmittel (40) gedrückt werden; wobei der Abstand (D) zwischen den zumindest zwei Schuhen (34;40,46) eines jeden Schlittens größer ist als der maximale Abstand zwischen den Riemen (24) von zwei unmittelbar benachbarten Modulen (8,8') des Förderers.

3. Förderer nach Anspruch 2, **dadurch gekennzeichnet,** daß jeder der Schuhe (34;45,46) durch einen starren Körper (35) gebildet wird, der mit dem Schlitten verbunden ist, und durch ein Reibelement (39), welches an dem starren Körper befestigt und dazu geeignet ist, mit dem Riemen (24) derart zusammenzuwirken, daß dieser daran befestigt ist.

4. Förderer nach einem der Ansprüche 2 oder 3, **dadurch gekennzeichnet,** daß Federmittel (40) zwischen dem Schuh (34) und dem Schlitten (2) angeordnet sind, so daß der Schuh gegen den Riemen (24) angedrückt bleibt.

5. Förderer nach einem der Ansprüche 2 bis 4, **dadurch gekennzeichnet,** daß die Gelenkverbindung (36;37) es ermöglicht, daß jeder Schuh linear in einer Richtung senkrecht zu dem Riemen (24) verschoben werden kann.

6. Förderer nach einem der Ansprüche 2 bis 5, **dadurch gekennzeichnet,** daß der Riemen (24) durch einen Riemen (42) gebildet wird, der an seiner dem Schuh (34;45,46) zugewandten Seite Zähne hat und daß der Schuh ein gezahntes Kupplungsglied (39') beinhaltet, welches dazu geeignet ist, mit den Zähnen des Riemens (42) ineinanderzugreifen.

7. Förderer nach einem der Ansprüche 2 bis 6, **dadurch gekennzeichnet,** daß der Riemen (24) auf einem länglichen Unterstützungselement läuft, welches jedes Modul (8) trägt und welches sich zwischen den Riemenscheiben (25, 26) erstreckt.

8. Förderer nach Anspruch 7, **dadurch gekennzeichnet,** daß das Unterstützungselement (31) eine Flachseite (32) hat, die dem Riemen (24) zugewandt ist, und die mit einer Schicht (33) eines reibungsarmen Materials beschichtet ist, wobei die Flachseite in Gleitkontakt mit dem Riemen steht.

9. Förderer nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet,** daß der Schlitten

(2) mittels zumindest zweier Paare (15) von Tragrädern entlang der Führungen (3) beweglich ist, die um parallele Achsen drehbar sind und auf den Führungen rollen, und daß zumindest ein weiteres Rad (16) vorgesehen ist, um den Schlitten seitlich entlang der Führungen zu führen.

10. Förderer nach Anspruch 9, **dadurch gekennzeichnet,** daß die Führungen durch ein Paar von C-Abschnitten (10;11) gebildet werden, die einander zugewandt sind und von denen jeder eine ebene, obere Bahn und eine parallele, untere Bahn bildet, wobei die Tragräder (15) entweder auf der oberen oder auf der unteren Bahn laufen können.

11. Förderer nach Anspruch 9 oder 10, **dadurch gekennzeichnet,** daß das weitere Rad (16) sich um eine zu den Achsen der Tragräder (15) senkrechte Achse dreht.

12. Förderer nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet,** daß der Schlitten (2) zumindest ein Eingriffsteil (44;48) aufweist, welches dazu geeignet ist, die Last entlang der Führungen (10;11) zu ziehen.

13. Förderer nach Anspruch 12, **dadurch gekennzeichnet,** daß das Eingriffsteil (44;48) ein Zugteil ist, welches drehbar auf dem Schlitten (2) gelagert ist.

Revendications

1. Transporteur d'un système de déplacement de charges, comprenant une structure de support (4), au moins un chariot (2) mobile le long de guides respectifs (3) supportés par la structure de support (4), le chariot (2) étant destiné à supporter et transporter une charge, un organe de transmission (24 ; 42) supporté par la structure de support (4) et s'étendant parallèlement aux guides (3), un dispositif de raccordement (34 ; 45, 46) supporté par le chariot et destiné à coopérer avec l'organe de transmission (24 ; 42) pour raccorder fermement le chariot (2) à l'organe de transmission, et un dispositif à moteur (27) destiné à activer l'organe de transmission afin qu'il déplace le chariot le long des guides, et dans lequel la structure de support est constituée de plusieurs modules rectilignes (8) indépendants mutuellement et juxtaposés bout à bout afin qu'ils forment un trajet prédéterminé, chaque module ayant son propre dispositif à moteur (27) qui est indépendant de ceux des autres modules (8), le dispositif de raccordement (34 ; 45, 46) étant tel que, lorsque le chariot (2) passe d'un premier module (8) à un second module (8') qui lui est immédiatement adjacent, le dispositif de raccordement soit toujours au contact de l'organe de transmission de l'un au moins des deux modules adjacents (8, 8'),
caractérisé en ce que, en combinaison :

(i) le dispositif de raccordement de chaque chariot (2) est constitué par au moins une paire de patins (34 ; 45, 46) qui peut coopérer avec l'organe de transmission (24 ; 42),
(ii) chacun des patins (34 ; 45, 46) est monté sur le chariot (2) par un raccord articulé (36 ; 37) destiné à permettre la variation de la position angulaire du patin et un déplacement linéaire du patin en direction perpendiculaire à l'organe de transmission (24 ; 42),
(iii) chacun des patins (34 ; 45, 46) est maintenu au contact de l'organe de transmission par un dispositif de poussée (40) qui pousse les patins contre l'organe de transmission (24 ; 42), et
(iv) les deux patins au moins (34 ; 45, 46) de chaque chariot sont séparés par une distance (D), mesurée dans la direction d'avance de l'organe de transmission (24 42), qui est supérieure à la distance maximale entre deux modules immédiatement adjacents (8, 8') du transporteur.

2. Transporteur selon la revendication 1, caractérisé en ce que chaque organe de transmission est constitué par une courroie sans fin (24) qui passe sur deux poulies (25, 26) placées à des extrémités opposées du module respectif (8), l'une des poulies (26) étant entraînée par un moteur, et en ce que les patins (34 ; 45, 46) peuvent coopérer avec une première face de la courroie (24) disposée à cet effet et contre laquelle ils sont poussés par le dispositif de poussée (40), la distance (D) comprise entre les deux patins au moins (34 ; 45, 46) de chaque chariot étant supérieure à la distance maximale entre les courroies (24) de deux modules immédiatement adjacents (8, 8') du transporteur.

3. Transporteur selon la revendication 2, caractérisé en ce que chacun des patins est constitué d'un corps rigide (35) raccordé au chariot, et par un élément de frottement (39) fixé au corps rigide et destiné à coopérer avec la courroie (24) afin qu'elle lui soit fixée.

4. Transporteur selon l'une des revendications 2 et 3, caractérisé en ce qu'un dispositif élastique (40) est disposé entre le patin (34) et le chariot (2) afin que le patin soit maintenu en pression contre la courroie (24).

5. Transporteur selon l'une des revendications 2 à 4, caractérisé en ce que le raccord articulé (36 ; 37) permet à chaque patin de se déplacer linéairement en direction perpendiculaire à la courroie (24).

6. Transporteur selon l'une des revendications 2 à 5, caractérisé en ce que la courroie (24) est constituée par une courroie (42) ayant des dents (43) sur sa face tournée vers le patin (34 ; 45, 46), et en ce que le patin comporte un organe denté (39') d'embrayage destiné à être prise avec les dents de la courroie (42).

7. Transporteur selon l'une quelconque des revendications 2 à 6, caractérisé en ce que la courroie (24) est disposée sur un élément longitudinal (31) de support qui est porté par chaque module (8) et qui s'étend entre les poulies (25, 26).

8. Transporteur selon la revendication 7, caractérisé en ce que l'élément de support (31) a une face plate (32) tournée vers la courroie (24) qui est revêtue d'une couche (33) d'un matériau à faible coefficient de frottement, la face étant en contact glissant avec la courroie.

9. Transporteur selon l'une quelconque des revendications précédentes, caractérisé en ce que le chariot (2) est mobile le long des guides (3) à l'aide d'au moins deux paires (15) de roues de support qui peuvent tourner autour d'axes parallèles et qui roulent sur les guides, et en ce qu'une roue supplémentaire au moins (16) est destinée à guider le chariot latéralement le long des guides.

10. Transporteur selon la revendication 9, caractérisé en ce que les guides sont constitués de deux profilés en C (10 ; 11) tournés l'un vers l'autre et délimitant chacun une voie supérieure plane (12) et une voie inférieure parallèle (14), les roues de support (15) étant destinées à se déplacer sur la voie inférieure ou sur la voie supérieure.

11. Transporteur selon la revendication 9 ou 10, caractérisé en ce que la roue supplémentaire (16) tourne autour d'un axe perpendiculaire aux axes des roues de support (15).

12. Transporteur selon l'une quelconque des revendications précédentes, caractérisé en ce que le chariot (2) comporte au moins un organe de coopération (44 ; 48) destiné à remorquer la charge le long des guides (10 ; 11).

13. Transporteur selon la revendication 12, caractérisé en ce que l'organe de coopération (44 ; 48) est un organe de traction qui peut pivoter sur le chariot (2).

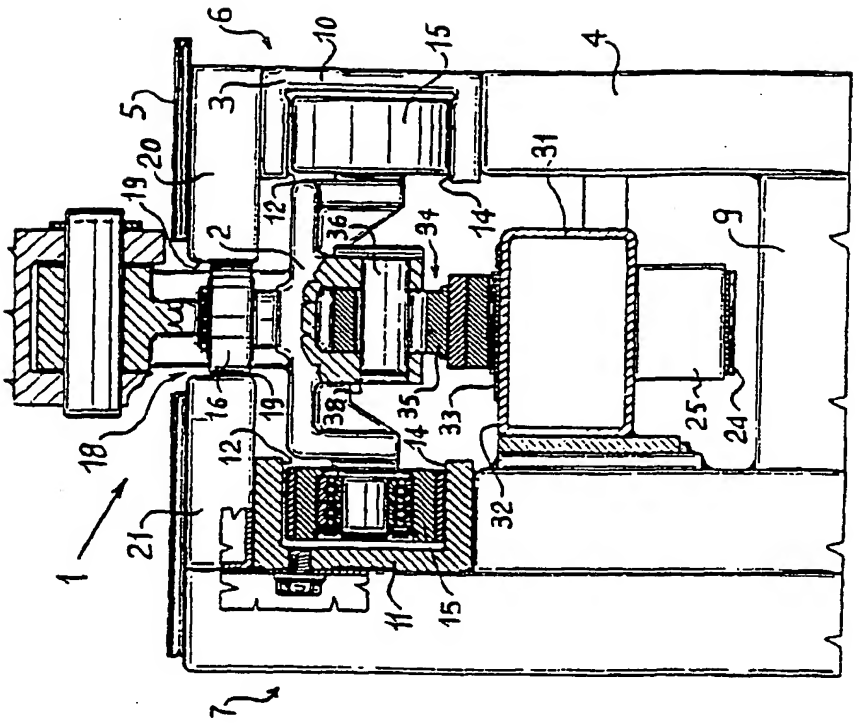

FIG.1

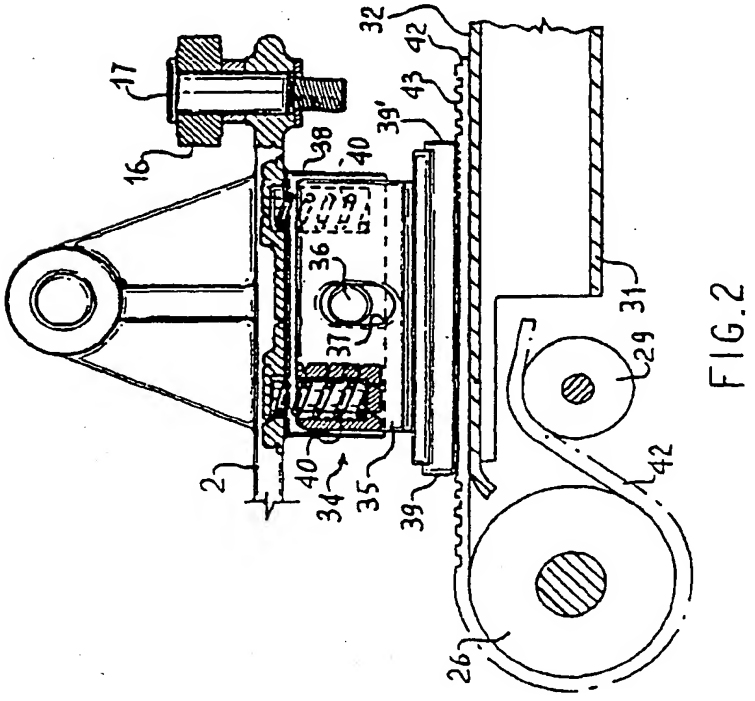

FIG.2

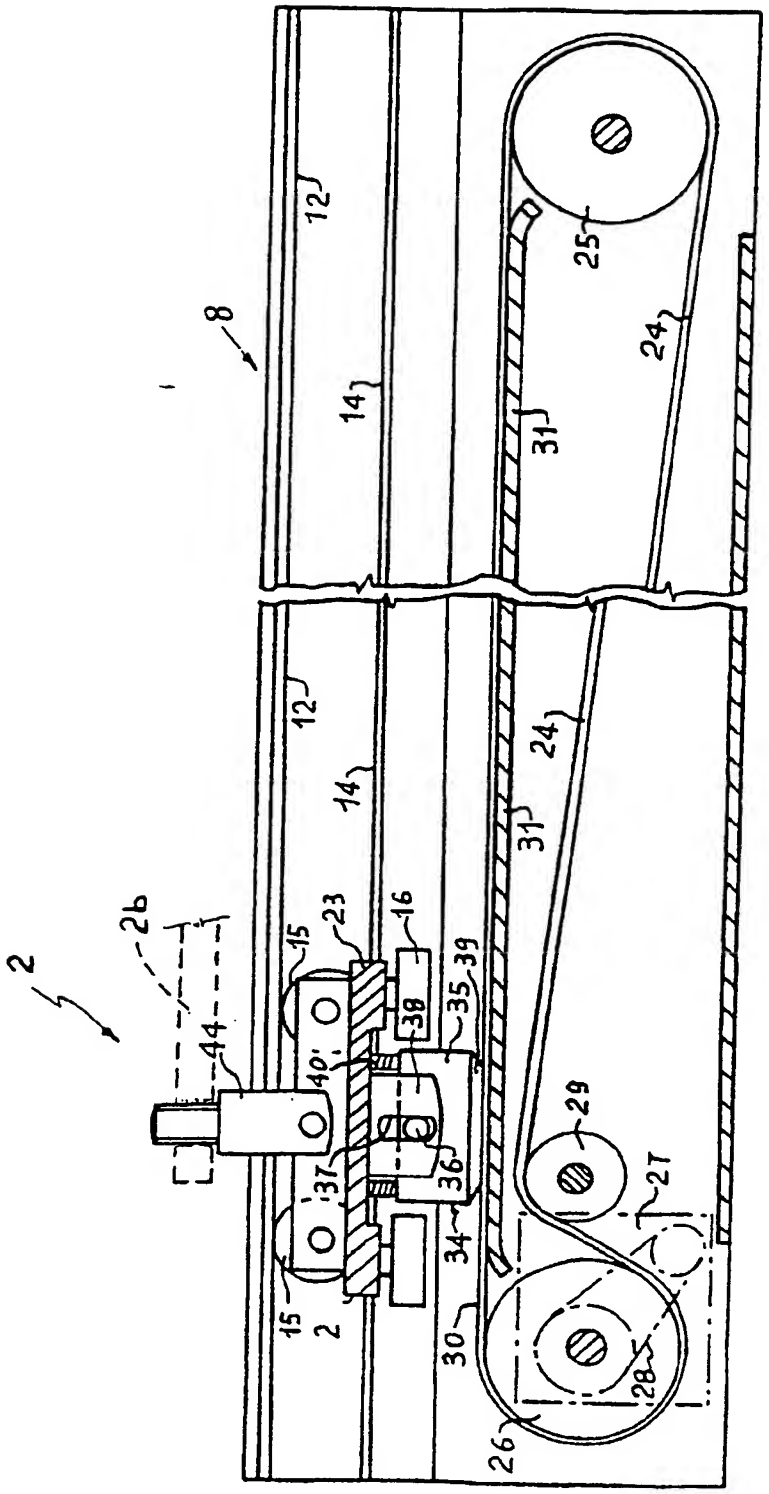

FIG.3

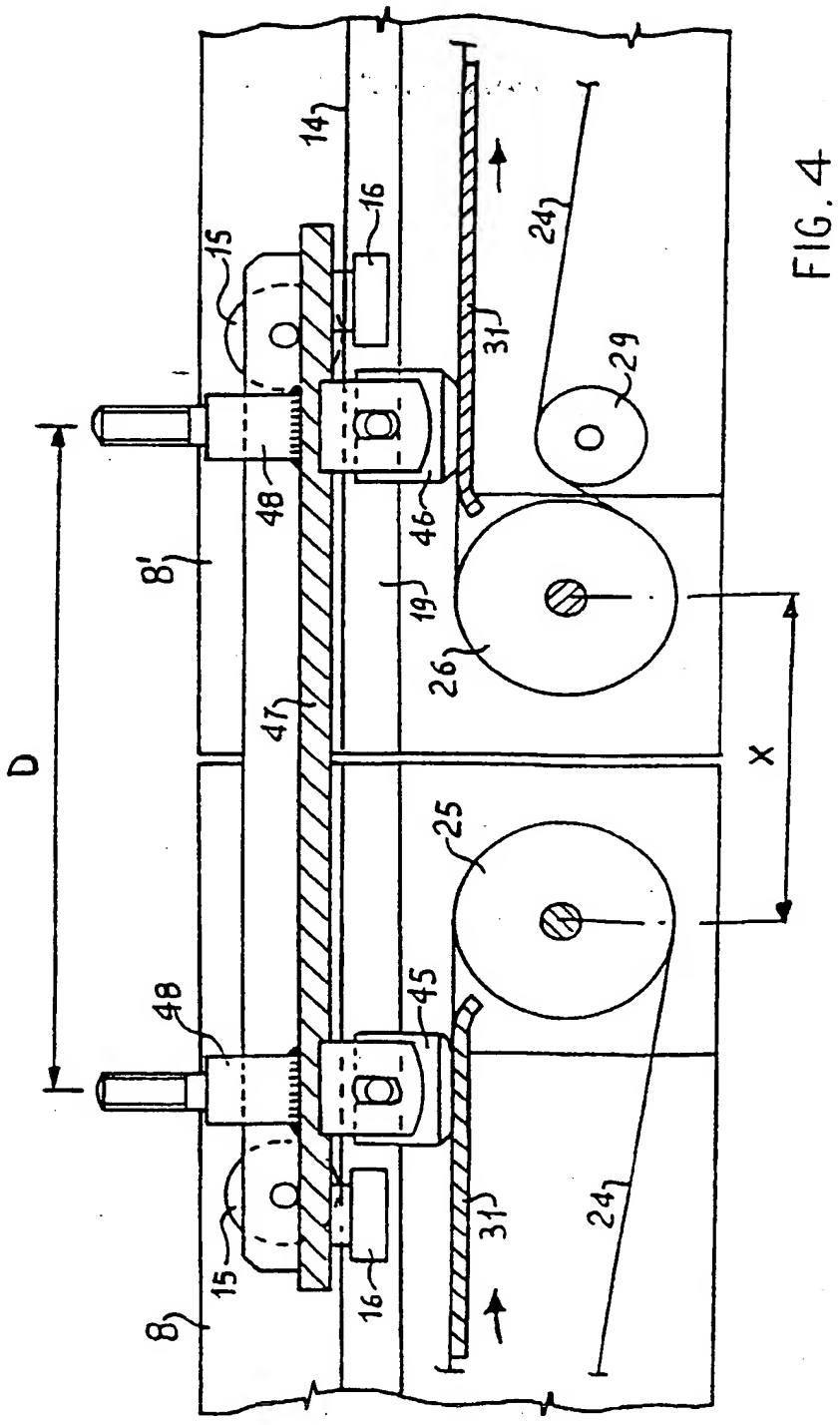

FIG. 4